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THE HISTORICAL BACKGROUND OF ENTOMOLOGY IN RELATION TO THE EARLY DEVELOPMENT OF AGRICULTURE IN CALIFORNIA

(Continued from page 11)

BY E. O. ESSIG

THE RUSSIAN PERIOD

The more important facts concerning this period have recently been published by the author in the Quarterly of the California Historical Society¹.

THE INTERMEDIATE PERIOD.² 1837-1848

During the brief period from the completion of secularization of the Missions in 1837 until the discovery of gold in 1848, agricultural development in California was retrograding. In the closing of the Missions the livestock was killed and marketed as hides, horns and tallow. New settlers were arriving and a few were planting trees and breaking new land. Gen. M. J. Vallejo had planted an orchard at the Pueblo Sonoma in 1830 which came into bearing during this period and other orchards are known to have been planted by J. W. Wolfskill in Yolo and Los Angeles counties in 1845. In 1846 additional foreign varieties of peach and pear trees were introduced.³

In 1830 it was estimated that there were five hundred foreigners in California. In 1840 there were more than one-thousand in addition to four thousand half-breeds. In 1846 there were two thousand Americans, six thousand of other nationalities, and approximately six thousand half-breeds, exclusive of the Indians.⁴

¹ Essig, E. O. The Russian settlement at Ross. California Historical Society, Quarterly, vol. 12, no. 3, special pub. no. 7, pp. 3-28, ill. Sept. 1933.

² For a general survey of conditions in California during the period see Dana, Richard Henry, Jr., Two years before the mast, (Boston, 1840) (Many later editions).

Robinson, Alfred, Life in California, (New York, 1846) (Several later editions).

Simpson, Sir George, An overland journey round the world during the years 1841 and 1842, (Am. Ed., Philadelphia, 1847), pp. 153-223. Simpson was Governor-in-Chief of the Hudson Bay Company's territories.

Revere, J. W., A tour of duty in California, (New York, 1849) (Includes 1845-1847).

³ Lelong, B. M., Horticultural history of California, State Board of Hort. of Calif., Ann. Rept., for 1892, pp. 33-49 (1892).

⁴ Ewer, W. B., Pacific Rural Press, vol. 10, p. 313 (Nov. 13, 1875).

The most notable agricultural development in California during this period was accomplished by Capt. John Sutter, who claimed all of the Sacramento Valley north of New Helvetia or Fort Sutter, which is the present site of the City of Sacramento, to the Sutter or Marysville Buttes, and, in addition, claimed the former Russian possessions at Bodega Bay, Russian River and Fort Ross by right of purchase. He also claimed portions of San Francisco, all of Benecia, and Brazos del Rio (Rio Vista). A superintendent was maintained at Fort Ross, but little progressive development occurred there. About New Helvetia, however, and in various parts of the great valley to the north, extensive farming operations were carried out. He had several hundred laborers as well as mechanics, cowboys, and others necessary to agricultural pursuits, and soldiers to maintain peace. He had great herds of horses, mules, cattle, and sheep, and produced large crops of wheat and other cereals. Orchards and vineyards were planted in the foothills and he became wealthy. His prosperity was short lived. When gold was discovered in 1848 his workmen deserted him, his livestock either perished for want of care or was stolen, his buildings fell into disrepair, his lands became the prey of squatters and new settlers. In short, he soon lost everything during the turbulent times immediately following the gold rush.

The period preceding the gold rush was of great uncertainty. Order was unknown. Small revolutions were common. Many nations contended for the prize, which, through the energy of a few far sighted men, finally fell to the organization of the Bear Flag Republic in 1846, and subsequent ownership of the United States. No one was greatly interested in agriculture or natural history—politics was the all absorbing subject!

The entomological activities during the early part of this time were centered with the Russians at Fort Ross, so that there is an overlapping here. I think it is worth while to compare the splendid work accomplished by the Russian scientists in America, under adverse conditions, thousands of miles from home, with the efforts of a similar group, the great and rich Hudson Bay Company whose members, although they had a marvellous opportunity, contributed practically nothing in entomology, but they did contribute generously in other biological sciences.

A European traveler, Picolomini, who came overland from the eastern states via Arizona and southern California, visited San Francisco a year or so prior to 1839 and collected a few beetles along the way. He evidently mixed his localities for a cicindelid beetle bearing his name, *Amblycheila picolomini* Reiche, obtained through Dupont is listed from San Francisco,⁵ but has so far only been taken in Arizona and New Mexico, and not in California.

Theodore Hartweg collected Coleoptera in Mexico during this period and was at Monterey in 1846-47 according to For-dyce Grinnell.⁶ His material, some at least, went to the British Museum and was described by Adam White.⁷ The species named for him, *Tylcus hartwegi* (White) (*Clytus*, *Trichoxys*), was taken at Oajaca, Mexico, and ranges into Arizona. White also described some beetles from California, *Ergates californicus* (White) (*Macrotoma*), and the female as *E. spiculiger* (White), synonyms of *E. spiculatus* Lec.; *Romaleum operarium* (White), a synonym of *R. hispicorne* (Linn.), questionably reported from the East Indies; *Megacyllene antennatus* (White) (*Clytus*) collected by Capt. Sir. E. Belcher on the West Coast of America, undoubtedly California (and ranges into Arizona), and some others. It does not appear that Hartweg took any of the species now listed from California.

THE PERIOD OF AMERICAN OCCUPATION, 1848

This extended and most important period may be divided into three eras as follows:

- I. Era of gold seeking, 1848-1852.
- II. Era of grazing and grain culture, 1852-1900.
- III. Era of fruit culture, 1875-.

I. ERA OF GOLD SEEKING, 1848-1852

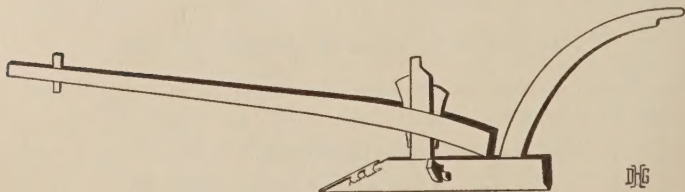
A mad rush followed the discovery of gold by James W. Marshall in 1848. Farms, towns and whole areas were completely deserted for the sake of the precious metal with the result that agriculture was almost entirely neglected. However,

⁵ Reiche, L., Ann., Soc. Ent., France, vol. 8, p. 560 (1839).

⁶ Bul. Brooklyn Ent. Soc., vol. 9, p. 69 (1914). Perhaps Monterey, Mexico?

⁷ Catalogue of longicorn coleopterous insects in the collection of the British Museum, Parts VII and VIII, 409 pp., 10 tabs. (1853-1855).

products of the soil soon became scarce and exorbitant prices were paid for the few that were obtainable. It is stated that in 1848 Peter Weimer, an employee of Sutter under James W. Marshall, who also shared in the discovery of gold, at Coloma, planted some apple seeds from dried fruit imported from the eastern states and in a few years had an apple orchard which yielded him good returns for many years after.⁸ In January 1849, Wm. H. Nash planted, in Napa County, an orchard consisting of 36 two-year old seedlings, the seeds of which had been brought from Kentucky. In the fall of the same year he ordered a lot of nursery stock from Rochester, N. Y., which was shipped around the Horn and arrived in the spring of 1850. These were evidently the first trees introduced from outside the state except at the Missions and at Fort Ross. In the latter year he also ordered more trees from Illinois and from Oregon. The peaches on two three-year old trees were sold for \$300 in 1850 to a San Francisco merchant who retailed them at one dollar each.⁹ Even so progressive a farmer as Mr. Nash used the California plow, which was little better than a forked stick shod with iron and drawn by oxen, until deep plowing was substituted about 1852.



About this time also peaches raised by A. P. Smith sold for from \$1.50 to \$2.00 each. The first foreign apples to reach the markets in California came from Chile in 1852.

⁸ Lelong, B. M., Horticultural history of California. State Board of Hort. of Calif., Ann. Rept., for 1892, p. 35 (1892).

⁹ Menefee, C. A., History and descriptive sketch book of Napa, Sonoma, Lake and Mendocino Counties, (Napa, Calif., 1873), p. 140. Corrections, substituting Rochester, N. Y., for Rochester, Pennsylvania, and Illinois for Massachusetts were evidently made by the author in the copy consulted in the Library of the University of California.

Other fruit trees were brought into California from Oregon in 1853 and were propagated from trees which were composted in a wagon and were kept growing throughout the long journey across the plains, arriving in Oregon in 1848.¹⁰

In 1850, when California was admitted into the Union as a state, there were 15,000 acres of land under cultivation. The first state agricultural exhibit was held at Sacramento¹¹ in 1852 and the honey bee was introduced the same year by Professor C. C. Shelton of San Francisco.¹²

In 1858 the grape phylloxera is supposed to have been brought to California on rooted vines, but real evidences of the pest did not appear until 1860¹³ and the insect itself was not discovered until 1874.

In 1850 P. J. M. Lorquin, a naturalist from France, began collecting insects in California, having been attracted by the gold rush of that time. He traversed much of the state on foot collecting chiefly Lepidoptera in what was then a virgin field. In 1852-1853 he collected in Sierra, Plumas, Eldorado, Sacramento, San Joaquin, Los Angeles, and San Diego counties in California and at Carson City in Nevada. In 1854-1856 he collected in Sierra, Plumas, Amador, Calaveras, Mariposa, Merced, Madera, Fresno, San Francisco, Marin, and Sonoma counties. His specimens were forwarded to the eminent French entomologist, J. A. Boisduval, who described most of them in 1852.¹⁴ Ninety-five species were taken, of which eighty-three were butterflies and twelve were moths. Fifty-three butterflies and nine moths were described as new species. A few species of Lepidoptera collected by Lorquin at this time fell into the hands of E. Doubleday, H. H. Behr, M. A. Guenée, A. R. Grote and C. T. Robinson.

¹⁰ Ewer, W. B., *History of California agriculture*. Pacific Rural Press, vol. 10, p. 313, (Nov. 13, 1875).

¹¹ Ewer, W. B., *op. cit.*, p. 316.

¹² Ewer, W. B., *op. cit.*, p. 313.

¹³ Davidson, W. M. and Nougaret, R. L., *The grape Phylloxera in California*. U. S. Dept. Agr., Bur. Ent., Bul. 903 (Prof. paper), pp. 4-5 (1921).

¹⁴ *Lépidoptères de la Californie*. Ann. Soc. Ent. France, vol. 21, pp. 275-324 (1852).

II. ERA OF GRAZING AND GRAIN CULTURE. 1852-1900

After 1851, thousands of immigrants, finding no gold, sought land and became farmers. During this era grazing and grain growing were the leading agricultural pursuits, but vegetable and fruit culture continued to develop. From 1850 to 1860 general agriculture in California increased 9-fold, and from 1860 to 1870 it increased $1\frac{1}{2}$ fold. In 1854 the State Agricultural Society was organized and a fair held at Sacramento. The first agricultural paper, *The California Farmer*, was also founded the same year at San Francisco. In 1855, the wheat yield was 5,833,000 bushels, of which 578,000 bushels were exported.* Barley, oats, Indian corn, rye, buckwheat, beans, peas, and potatoes were also extensively grown and yielded large crops.

"Some rare specimens of vegetables and fruits were exhibited at the State Agricultural Fair of 1856. I saw them myself, and have no doubt as to correctness of the published statements in regard to them. There were exhibited two pumpkins from Sacramento, weighing two hundred and ten, and two hundred and forty pounds. Those were 'some pumpkins', were they not?

*According to the Rev. William Taylor in *California Life Illustrated*, (London edition, 1867, p. 251. "—in the year 1856 there were 578,962 acres in California cultivated in cereal grain. Wheat, 176,963 acres, yielding 3,979,032 bushels. Barley, 154,674 acres, yielding 4,639,678 bushels. Oats, 37,602 acres, yielding 1,263,359 bushels. The average yield of wheat for 1856 was twenty-three bushels per acre, which owing to a severe drought of the early part of the season, was much less than of the previous years. The average yield of barley is thirty bushels per acre. It frequently yields from fifty to seventy-five bushels per acre. The average yield of the oat crop is thirty-three bushels per acre. Crops of this grain have frequently averaged seventy-five bushels per acre; and a crop of thirty-two acres in Alameda County, which received a premium at the State Agricultural fair for 1856, averaged one hundred and thirty-four bushels to the acre." In 1856 there were 11,020 acres of Indian corn, "averaging for the entire crop, thirty-one bushels per acre."

According to G. W. Hendry "The period of greatest grain production was from 1866 to 1900. The peak in wheat production occurred in 1886 when 3,000,000 acres were planted and 45,000,000 bushels harvested."

"A beet, grown by Colonel Hall, of Sacramento City, weighing seventy-three pounds;¹⁵ a carrot, weighing ten pounds, measuring one foot and eight inches in circumference, and three feet and three inches in length. There were fifty in the same bed of equal size. The seeds were sown June 25, and the carrots dug September 20. A tomato, seventeen inches in circumference; a squash, weighing one hundred and forty-one pounds; an onion weighing two pounds and fifteen ounces, and measuring twenty inches in circumference; a cornstalk twenty-one feet and nine inches in height," etc.¹⁶ And these figures are given by a minister who was not a Californian! The Rev. Taylor continues: "The soil of California, as proved by successful experiment, is well adapted to the production of cotton, tobacco, sugar-cane, sugar-beet, and mulberry; and it is believed that rice will grow as well on her marsh lands as in China.

"California is also destined to become one of the greatest fruit-growing countries in the world and great attention is being given to the cultivation of the best varieties." In 1856 Taylor gives the following statistics relative to fruit culture:

Apples trees, 325,000; peach trees, 619,000; pear trees, 59-171; cherry trees, 25,264; miscellaneous fruit trees of other kinds, 271,855; and grapevines, 1,531,224. (Taylor p. 256).

Citrus culture in Northern California began after the famous Bidwell's Bar orange tree came into bearing in 1865.** It demonstrated the possibilities of growing oranges in certain localities in the northern part of the State.

Of livestock the following figures for 1856 are given: "horses, 106,991; mules and asses, 30,641; cattle, 684,248;

**The interesting history of this tree is given by E. W. Maslin in a letter received from I. R. Ketchum of Bidwell's Bar, dated July 31, 1888, (State Board of Hort. of Calif., Third Bien. Rept., pp. 38-39, 1888), as follows: "The Bidwell Bar orange tree was raised from the seed of an orange that came from Acapulco, Mexico, by John Morrill, at Sacramento, California, in 1855. (Mr. Morrill's letter to myself in 1866 is enclosed.)

"The tree is fifty inches in circumference six inches above the ground, is twenty-six feet six inches in height, and twenty-four feet, through the branches.

¹⁵ John S. Hittell reports a mangel-wurzel beet weighing 118 pounds, being 1 foot in diameter by 5 feet long and 3 years old. *The Resources of California*, (San Francisco, 1875), ed. 6, p. 238.

¹⁶ Rev. William Taylor, *op. cit.*, pp. 253-4.

sheep, 253,312; goats, 4,544; swine, 186,585; poultry, 266,336." (Taylor p. 259).

"The number of grist mills in the state is 135. Thirty-seven mills are propelled by steam, and fifty-four by water. They had a combined capacity of 8,792 barrels a day." (Taylor p. 261-2). In spite of this it is stated that flour was imported until 1862.

In 1873 the wheat crop amounted to 35,000,000 bushels, of which nearly 18,000,000 bushels, or enough to load 550 first class ships of that time, were exported. The total value of all agricultural crops for that year was \$17,000,000. In 1875 California became the greatest wheat-producing state in the Union and the second greatest producer of fruits. At that time, 2,700,000 acres were under cultivation. The sugar beet industry was established this same year and the production of wine amounted to 9,000,000 gallons valued at \$4,000,000.¹⁷ In this

"Mr. R. T. Van Norden, now real estate agent at 413 Montgomery Street, San Francisco, purchased the tree of Mr. Morrill in March, 1859, and it came here from Sacramento in a ten-inch tub, was five feet high, and had five branches.

"The tree has been in my care since it was brought here in 1859. It was first set out under a wall by Mr. Howard Burt, in the south side of the office, but was afterwards removed to its present location. Had it been left in the first location, the freshet of January, 1862, would have carried it off, as it did a number of other fruit trees.

"It bore oranges for the first time in 1865; had forty oranges. In 1866 it bore five hundred. In 1882 the crop numbered two thousand two hundred, about seven hundred more than any one year before or since. The regular crop is about eight hundred.

"It is evidently of the Los Angeles variety.

"Some years many of the oranges are very large. Seven years ago two oranges weighed, together, two pounds fourteen ounces. Generally round, some few oblate; skin of all the larger oranges is thick; of the smaller, thin.

"It takes twelve months to fully mature its fruit. The first of December the fruit is a sulphur color. The first of January, an orange color. After fully coloring the fruit increases in size from one fourth to one third.

"I send you a photograph of the tree and bridge, as you have taken an interest in it. Mr. Lelong can get from Mr. Van Norden his account of the origin."

¹⁷ Ewer, W. B., History of California agriculture. Pacific Rural Press, vol. 10, pp. 313, 316 (Nov. 13, 1875).

year phylloxera was first observed to be a serious pest and recorded in print by Dr. E. W. Hilgard,¹⁸ although its presence had been discovered the previous year. Up to that time the grape growers of California had been observing the effects of this insect on the vineyards of France and its sudden appearance in Sonoma County created intense momentary interest which had to be continuously kindled by Dr. Hilgard and others who were interested in finding methods to limit the spread and to control the pest.

In 1875 the honey bee within the state produced 1,000 tons of honey.¹⁹

III. ERA OF FRUIT GROWING. 1875.

According to Lelong in 1870 fruit growing became an established and independent pursuit as a result of the completion of the trans-continental railroad in 1869 which gave an outlet to the developing markets in the east and middle west.

In 1871 the production of fresh fruits amounted to 1,823,310 pounds which included the entire output. By 1891 the fresh fruits had increased to 98,680,100 pounds and there were also added dried fruits, 65,090,220 pounds; raisins, 44,954,850 pounds and canned fruits, 49,566,680 pounds. The total acreage of fruits in 1891 was 200,000.

These figures may seem to be a little out of place in a paper of this kind, but I think they are necessary to show both the variety and magnitude of the production and the value of the field crops, fruits, vegetables, livestock and other agricultural resources, which are regularly affected by insect pests. The readjustments of the native insects, the introduction and establishment of foreign pests, the testing and proving of sprays, baits, dusts, and fumigants, and the development of biological control methods are better comprehended when one thinks of the agricultural accomplishments since 1769.

At the present time California produces over one hundred and eighty commercial crops,^{***} including the following:

***An itemized list of one hundred and seventy-six crops, was compiled by B. H. Crocheron, Director of Extension, Calif. Agr. Expt. Sta., Pacific Rural Press, vol. 110, p. 103 (Aug. 1, 1925).

¹⁸ Pacific Rural Press, vol. 10, p. 275 (Oct. 30, 1875).

¹⁹ Ewer, W. B., op. cit., p. 313.

²⁰ Lelong, B. M. op. cit., pp. 35-36.

Deciduous fruits.....	15 kinds	Vegetables	52 kinds
Small fruits.....	7 kinds	Seeds	32 kinds
Subtropical fruits.....	17 kinds	Bulbs	7 kinds
Nuts	7 kinds	Ornamentals	8 kinds
Field crops.....	13 kinds	Miscellaneous	7 kinds
Grains	11 kinds		

According to the Federal State Agricultural statistics compiled by E. E. Kaufman, Statistician,²¹ "The acreage of tree fruits, nuts and vineyards of bearing age for the 1926 crop was 1,619,900. For that year the total farm value of the main fruit crops was \$215,983,000, which was equivalent to a return of \$133.33 per harvested acre. The harvested area devoted to the production of vegetable crops amounted to 315,000 acres and the average return per acre was \$182.10 making a total return of \$57,360,000. The total value of all main field, fruit and vegetable crops amounted to \$432,855,000. The annual production survey of California agriculture for 1926 brings out two outstanding facts when compared with the survey for the previous year. The area harvested that season exceeded the 1925 harvested area by 264,000 acres or 4 per cent, and the value to the grower decreased by \$32,586,000 or about 7 per cent."

A ROOT-BORING DEROBRACHUS

Derobrachus geminatus var. *forreri* Bates has been reported from Santa Rosalia, Baja California, as attacking the roots of olive trees. This makes a third genus from among the *Prioninae* whose larvæ have been proven to be root borers, the others being *Prionus* and *Stenodontus*.—Edwin C. Van Dyke.

A commercial crop is defined as one produced yearly on an acreage basis. The list omits a number of kinds of flower seeds, roses and other ornamental nursery stock, bearded iris, several subtropical fruits, cacti (forage and fruit), pyrethrum, and a few bush berries. It does not contain cattle, calves, milk, cream, casein, butter, cheese, hogs, goats, sheep, wool, horses, mules, poultry, eggs, and many other items produced on our farms.

²¹ Calif. State Dept. Agr., Monthly Bul., vol. 16, p. 35 (1927).

STUDIES IN THE CERAMBYCIDÆ OF LOWER CALIFORNIA

BY E. GORTON LINSLEY

Oakland, California

The following notes and descriptions are based upon material in the collection of the California Academy of Sciences, mainly from the expedition of the Academy to the Gulf of California in 1921. Several species are recorded from this region for the first time, two of which are described as new. The writer is indebted to Mr. E. P. Van Duzee for the privilege of making this study.

STENODONTES (NOTHOPLEURUS) LOBIGENIS Bates

A long series of the typical form of this species was taken at Puerto Ballandra, Carmen Island, on the Gulf of California, May 22, 1921, by Virgil Owen. Several additional specimens were captured at La Paz, Baja California, on June 4, 1921, by J. C. Chamberlin.

DEROBRACHUS GEMINATUS LeConte

Two specimens, taken on Angel de la Guardia Island, Gulf of California, July 1, 1921. (E. P. Van Duzee.)

EUSTROMULA VALIDUM LeConte

A single example of *E. validum* was found under a stone on Monserrate Island, Gulf of Calif., May 25, (J. C. Chamberlin.)

METHIA BREVIS Fall

A specimen of this recently described longicorn was captured at Angeles Bay, Lower California, June 25, 1921, by E. P. Van Duzee, and very kindly compared with the unique type by Dr. Fall. This is the first Lower California record for the genus *Methia*.

ANOPLODERA INSIGNIS Fall

This rather rare species has always been thought to inhabit only a very small area near Monterey Bay, California. However, on July 15, 1922, Dr. G. D. Hanna and J. R. Slevin found a typical example of *A. insignis* on Guadalupe Island. This distribution is not surprising when one considers that the

Monterey Pine, *Pinus radiata*, in which the species lives, also has the same "spotted" distribution.

Stenosphenus basicornis Linsley, n. sp.

Moderately short, shining, rufous; elytra and abdomen black. Head narrow, coarsely, closely punctured; eyes deeply emarginate, finely granulate; antennæ shorter than the body in both sexes, finely pubescent, ciliated on inner side; scape slender, rufous; second segment slightly longer than broad, rufous; remaining segments piceous, three to seven spinose at apex. Prothorax about as broad as long, wider at base than at apex, sides arcuate; surface smooth, with a few large scattered punctures and erect pale hairs. Scutellum transverse, rounded behind, densely pubescent. Elytra more than three times as long as broad; coarsely, regularly, but not closely punctured, clothed with suberect pale hairs; apices sinuately truncate, the angles dentiform. Legs short, slender, clothed with suberect pale hairs; femora rufous, not clavate; tibiæ piceous at base, black at apex, strongly carinate externally; tarsi piceous. Prosternum of male coarsely, cribrately punctured at sides, with a transverse polished area along apical margin and a shining median longitudinal line from base to apex; prosternum of female less coarsely and more evenly punctured. Abdomen with a few large scattered punctures and suberect hairs; fifth ventral segment of male nearly twice as broad as long and truncate at the apex, in the female only one-half wider than long, narrowed and feebly emarginate at apex. Length 7.3 mm; breadth 2.5 mm.

Holotype male (No. 3845), allotype female (No. 3846, Calif. Acad. Sci. Ent.), and one paratype male, taken on Tiburon Island, Gulf of California, July 5, 1921, by E. P. Van Duzee, on a species of *Prosopis*.

This pretty little species is more closely related to *S. lepidus* Horn than to any other species known to the writer, but is smaller (7-7.3 mm.), with the antennæ shorter than the body in both sexes and the prothorax as long as broad.

STENOSPHEUS NOVATUS Horn

Taken at Miraflores, Lower Calif., July 29, 1919, (J. R. Slevin).

STENASPIS SOLITARIA Say

One example from Salinas Bay, Carmen Island, June 16, 1921, (J. R. Slevin).

TRAGIDION ANNULATUM LeConte

A typical specimen found on Danzante Island, Gulf of Calif., May 24, 1921, by J. C. Chamberlin.

METALEPTUS FEMORATUS Schaeffer

A specimen taken at San Pedro Bay, Gulf of Calif., July 7, 1921, (E. P. Van Duzee) was very kindly compared by Dr. Fall with examples in his collection from the type locality. This species also occurs at Los Mochis, Sinaloa, Mexico, (C. T. Dodds, collector).

SPHÆNOTHECUS PALLIDUS Schaeffer

A small series of this species was beaten from Palo Verde at Agua Verde, Lower Calif., May 26, 1921, (E. P. Van Duzee). Additional specimens were taken on Tiburon Island, Gulf of Calif., July 4, 1921 and San Jose Island, Gulf of Calif., May 28, 1921, (E. P. Van Duzee).

SPHÆNOTHECUS BIVITTATUS Dupont

Examples of this widely distributed Sonoran insect were taken at Puerto Ballandra, Carmen Island, Gulf of Calif., May 22, 1921, by E. P. Van Duzee.

IPOCHUS FASCIATUS LeConte

Typical examples of *I. fasciatus* were captured on San Martin Island and at San Quentin, Lower, Calif., on June 7-8, 1926, by H. H. Keifer.

MONEILEMA SEMIPUNCTATUM LeConte

Two specimens found by J. R. Slevin at San Pedro, Lower Calif., on July 15, 1919.

MONEILEMA SUBRUGOSUM Bland

Taken at San Pedro, Lower Calif., July 5, 1919, (J. R. Slevin), and Carmen Island, Gulf of Calif., June 16, 1921, (E. P. Van Duzee). The specimens were taken on cholla cactus.

MONEILEMA GIGAS LeConte

Several specimens, rather doubtfully referred to this species, were captured on San Lorenzo Island, Gulf of Calif., June 24, 1921, and San Pedro Bay, Gulf of Calif., July 7, 1921, by E. P. Van Duzee. Also found on cholla cactus.

ACANTHODERES PENINSULARIS Horn

This typical Lower Californian species was taken on San Martin Island, June 8, 1925, by H. H. Keifer.

CÆNOPÆUS PALMERI LeConte

Taken on cholla cactus at San Pedro Bay, Calif., July 7, 1921, by E. P. Van Duzee.

PERITAPNIA NUDICORNIS Bates

One example, San José Island, Gulf of Calif., June 10, 1921, (J. C. Chamberlin).

Adetus vanduzeei Linsley, n. sp.

Elongate, slender, yellowish-brown; densely clothed with a short, appressed, white and tawny pubescence which completely obscures the punctuation. Head broad, densely clothed with brownish pubescence, with four white patches on face; eyes small; antennæ attaining the middle of the elytra in the male and the basal third of elytra in the female; scape short, stout, a little more than twice as long as broad, third segment one-third longer than first, fourth about as long as first, fifth and following segments much shorter, diminishing rapidly in length toward apex. Prothorax slightly longer than broad, almost uniformly white except for two tawny basal spots and an irregular smooth discal vitta. Scutellum white, densely pubescent. Elytra two and one-half times as long as broad, sides subparallel; pubescence short, white, dense, with an oval patch of tawny pubescence at sides a little behind the middle, and a subapical tawny spot; apices obliquely truncate. Legs short, brownish variegated with white; first segment of posterior tarsi a little longer than second. Body beneath densely clothed with white pubescence; fifth ventral abdominal segment short and slightly emarginate in the male, excavated before the apex and longitudinally grooved in the female. Length 6.5-9 mm; breadth 2-2.5 mm.

Holotype male (No. 3847), allotype female (No. 3848, Calif. Acad. Sci. Ent.), and three paratypes, reared from *Ibervillea* collected on Cerralbo Island, Gulf of California, June 6, 1921, by E. P. Van Duzee. The specimens emerged in the laboratory in September 1921. It is with sincere pleasure that this fine species is dedicated to Mr. E. P. Van Duzee as a slight tribute for the generous assistance and encouragement that he has given to the writer.

A. vanduzeei is easily known from all other members of the genus by the dense, short, white pubescence, the disposition of the brown areas of the elytra, and the short prothorax.

ATAXIA ARIZONICA Fisher

Two specimens taken at San Nicolas Bay, Gulf of Calif., May 16, 1921, by E. P. Van Duzee.

ESTOLA SORDIDA LeConte

Taken on Cedros Island, Lower Calif., August 4, 1922, by Dr. G. D. Hanna and J. R. Slevin, and on Ildefonso Island, Gulf of Calif., May 17, 1921 by I. M. Johnston.

COLORED LIGHTS FOR MOTHS

BY EDWARD GUEDET

Napa, California

The old time lepidopterists conducted quite a few experiments with colored glasses on the coal oil lamps used for light traps. Professor Rivers was one of those who convinced himself of the attractive powers of red and blue lights where white lights failed to attract.

That his theory has some value, was demonstrated this spring when, with Mr. James E. Cottle of Hayward, California, the writer took a trip to Palm Springs. This delightful town is the center of a good collecting area when there has been some rainfall on the desert. It does not possess lamp posts of any kind and the store windows, lighted with modern lights to attract the attention of promenaders, attract also a variety of moths. It was noted that the modern Neon lights in blue and red colors attracted quantities of Noctuids, Geometers and micros, as well as the common *lineata* and other sphinx moths. The point of interest to us, as we availed ourselves of the material thus brought within easy reach, was that these colored lights would attract, where the white lights, sometimes even more favorably located, failed to attract.

For those who are interested in light traps, it seems possible that an arrangement of colored glasses around the light might add to the attractive power of the trap.

A REVISION OF THE GENUS *CEPHALOON* NEWM.BY RALPH AND GEORGE R. HOPPING¹

Dr. Van Dyke² in his comments after describing *Cephaloon pacificum*, remarks that the genus should not be split up into weak genera as was done by Col. Casey³ but suggests that they should be considered as subgenera. Most of the characters of *Cephaloon*, *Sponidium* and *Typitium* given are so variable that, in the opinion of the writers, they cannot even form subgenera.

The few characters they possess hardly suffice to separate the species in order to form an adequate key. *Drachylis* seems to be the exception as the claws are described as not being appendiculate, besides other radical differences.

The keys of Dr. Horn⁴ and Col. Casey³ are not workable as many of the characters used are based on colour or are variable within the species.

Colour, in at least some of the species, is so variable that it can only be used in a restricted sense. Of 67 specimens of *C. tenuicorne* Lec. (*piceum* Horn) taken at Stanley in the type locality of *piceum* the "Cariboo District of British Columbia", 16 are males and 51 are females. The males are all entirely black, with the exception of the legs of a few which are variously bi-coloured. The females vary from entirely black to entirely testaceous (*tenuicorne* Lec.) with every intergrade. Therefore Dr. Horn's use of colour to separate *piceum* Horn from *tenuicorne* Lec. will not hold.

The form of the prothorax is variable in shape in the same species. The margins may be quite evenly rounded or quite angulate in the same species, or the pronotum convex or comparatively flat.

The distance between the eyes has been used as a specific character. This is more or less sexual, the males generally being much narrower between the eyes than the females, but even between individuals of the same sex and species it is somewhat variable.

¹ Contribution from the Division of Forest Insects, Entomological Branch, Dept. of Agriculture, Ottawa Canada.

² Bull. Brook. Ent. Soc., vol. XXIII, 1928, p. 261.

³ Ent. News, vol. IX, 1898, pp. 193-195.

⁴ Coleop. of Baja Calif., Supp. II, 1896, p. 380.

The measured distance between the eyes of the sexes of three of our western species are given below.

<i>Cephaloon bicolor</i> Horn		<i>Cephaloon vandykei</i> n. sp.	
Males	Females	Males	Females
1. .264 mm.	1, .396	1, .220 mm.	1, .594
2, .220	2, .484	2, .176	2, .506
3, .220	3, .506	3, .242	3, .440
4, .242	4, .484	4, .154	4, .550
5, .176	5, .462	5, .264	5, .440
6, .198	6, .506	6, .220	6, .440
7, .220	7, .484	7, .220	7, .528
8, .176	8, .440	8, .220	8, .506
9, .154	9, .484	9, .220	9, .484
10, .220	10, .440	10, .154	10, .484
Ave. .209 mm.	Ave. .469 mm.	Ave. .209 mm.	Ave. .497 mm.

Cephaloon pacificum Van D.

Males	Females
1, .264 mm.	1, .330
2, .242	2, .330
3, .220	
Ave. .242 mm.	Ave. .330 mm.

Therefore it may be seen that the use of this character in a key is impossible. Although the emargination of the last ventral segment in our western species is quite distinctive, both between the species and between the sexes, the males have another character of which the only mention is in Colonel Casey's description of *C. versicolor*, male,⁵ where he says:

"The posterior margin of the third segment has a small bifurcate process." This bifurcate process is present in the males of all of our western species except *pacificum* Van D., and seems to be indicated faintly in the eastern *C. unguare* Lec.

The types of *C. piceum* Horn and *C. bicolor* Horn were very kindly examined for us by Mr. Charles Liebeck, with the result that the supposed males of each have not the bifurcated process and therefore are females. Of the latter species, only the type remains in the Horn collection. In most collections, the males are either not recognized or are not present because the females seem greatly to outnumber the males. Of one species before us there are 140 females but only 30 males.

⁵ Ann. N. Y. Acad. Sci., IX, 1897, p. 652.

In all the males of the western species, the last ventral is broadly, rather deeply emarginate; in the females the last ventral is usually deeply but much less broadly emarginate. In the group having the broad pulvilli, the apex of the pulvillus may be slightly acute or obtuse according to the side or angle from which it is viewed. These pulvilli are soft structures and are sometimes distorted in the dried insect. However the slender curved pulvilli (fig. 16) of the group containing *C. unguare* Lec. and *C. pacificum* Van D. are unmistakable.

The combined length of the three distal segments of the antenna forms a reliable character for distinguishing certain of the species as is shown by the following table:

Combined length of the three distal antennal segments.							
<i>C. tenuicorne</i>		<i>C. vandykei</i>		<i>C. bicolor</i>		<i>C. pacificum</i>	
Lec.		n. sp.		Horn		Van D.	
♂	♀	♂	♀	♂	♀	♂	♀
1.21	1.10	1.06	1.23	1.60	1.63	3.34	1.85
1.05	1.10	1.17	1.10	1.45	1.45	3.21	
1.10	1.14	1.17	1.23	1.67	1.47	Ave.	
1.21	1.23	1.23	1.21	1.43	1.54	3.28	
1.32	1.10	1.10	1.28	1.67	1.78		
1.16	1.27	1.19	1.23	1.65	1.65		
1.21	1.10	1.10	1.32	Ave.	1.72		
1.16	1.21	1.19	1.21	1.58	1.76		
1.10	1.21	1.17	1.19		1.47		
1.14	1.27	1.10	1.17		1.43		
Ave.	Ave.	Ave.	Ave.	Ave.			
1.17	1.17	1.15	1.22	1.59			
<i>C. lepturides</i> Newm.				<i>C. unguare</i> Lec.			
♂	♀			♂	♀		
1.21	1.08			2.64	2.20		
1.03	.92			2.68	2.05		
1.10	1.03				1.98		
Ave.	Ave.			Ave.	Ave.		
1.11	1.01			2.76	2.07		

We wish to thank the following for their help: Mr. P. J. Darlington and Mr. Charles Liebeck who kindly compared specimens with the types; Dr. E. C. Van Dyke who loaned material and paratypes of *C. pacificum*; Mr. E. R. Leach, Mr. F. T. Scott, Mr. Chas. Liebeck, who loaned material and Dr. F. E. Blaisdell, who sent his own material and that of the California Academy of Sciences. Mr. H. S. Barber and Mr. L. L. Buchanan also examined material for us.

KEY TO THE SPECIES

- A. Pulvilli or appendages of the tarsal claws very slender, acute, and curved at the tip (fig. 16).
 - B. Lateral margins of pronotum behind the middle almost straight. Eastern species.....1. *ungulare* Lec.
 - BB. Lateral margins of pronotum behind the middle distinctly emarginate. Western species.....2. *pacificum* Van D.
- AA. Pulvilli, or appendages of the tarsal claws robust, obtuse, not curved at tip (fig. 17).
 - B. Antennæ with terminal joints evidently thickened distally (fig. 10). Eastern species ..3. *lepturides* Newm.
 - BB. Antennæ only slightly thickened distally (fig. 13, 14, 15). Western species.
 - C. Three distal antennal segments approximately 1.5 mm. (fig. 14). Coastal species.....4. *bicolor* Horn.
 - CC. Three distal antennal segments barely over 1 mm. (fig. 13, 15). Interior species.
 - D. Bifurcate process of 3rd ventral long and fingerlike (fig. 2); males, colour black.....
 - 5. *tenuicorne* Lec.
 - Last ventral shallowly and narrowly emarginate (fig. 6); females, colour black to testaceous.....5. *tenuicorne* Lec.
 - DD. Bifurcate process of 3rd ventral shorter, more triangular (fig. 1); males, colour testaceous....
 - 6. *vandykei* n. sp.
 - Last ventral deeply emarginate (fig. 5); females, colour, elytra and metasternum black, remainder reddish testaceous.....
 - 6. *vandykei* n. sp.

1. CEPHALOON UNGULARE Lec.

1874, Proc. Bost. Soc. Nat. Hist., vol. XVI, p. 275.

Length male 10-12 mm.; female 12-13 mm. This species is closely related to *C. pacificum* Van D., but differs as in the key, having shorter antennæ in the males and in being somewhat more finely punctate throughout. All of our specimens are testaceous except some with dark areas on the head, pronotum and abdomen.

Type locality, White Mts. and Lake Superior.

Six specimens are before us from New Hampshire, North Carolina, New York. In literature "L. Sup." is given.

2. CEPHALOON PACIFICUM Van D.

1928, Bull. Brookl. Ent. Soc., vol. XXIII, p. 260.

Length male 13-14 mm.; female 15 mm. Easily distinguished from other western species by the slender pulvilli, the elongate terminal joints of the antennæ, and the absence of the bifurcate process on the middle abdominal segment on the male. The males have definite marginal and sutural black vittæ and the head, antennæ and pronotum are mostly black; females mostly testaceous.

Type locality, Forks, Washington.

Five specimens are before us, including a male and female paratype from Washington and three specimens, two males and one female, from British Columbia. In literature California is given.

3. CEPHALOON LEPTURIDES Newm.

1838, Ent. Mag., V, p. 377.

C. lepturoides Hald., 1848, Jl. Acad. Nat. Sci., Phila. (2) p. 95.

C. varians Hald., 1848, Jl. Acad. Nat. Sci., Phila. (2) p. 95.

Length male 9-10 mm.; female 10-14 mm. An Eastern species easily identified by its short antennæ with the three distal segments greatly thickened. The colour varies from testaceous to black.

Type locality, undetermined.

Fourteen specimens are before us from Philadelphia, New Hampshire, Michigan, Ontario, Quebec, Maine. "L. Sup." and "Conn." are given in literature.

4. CEPHALOON BICOLOR Horn.

1896, Col. Baja Calif., Supp. II, Proc. Calif. Acad. Sci., (Ser. 2), VI, p. 381.

Length male 11-12 mm.; female 12-16 mm. The males are either entirely testaceous or with indications of black vittæ marginating the elytra and sometimes with a black spot on the pronotal disc. They resemble the males of *C. vandykei*, but may be distinguished by the appreciably longer distal three segments of the antennæ, the more rounded emargination of the last ventral segment, and the more shining appearance. The females vary

from entirely black to entirely testaceous. Specimens with black elytra, but with pronotum and head rufous, are not uncommon. This is a coastal species which apparently does not occur in the interior.

Type locality, Sonoma Co., California.

Eighteen specimens are before us from British Columbia and California.

5. CEPHALOON TENUICORNE Lec.

1874, Proc. Boston Soc. Nat. Hist., vol. XVI, p. 275.

Cephaloon piceum Horn, 1896, Coleop. Baja Calif., Supp. II, Proc. Calif. Acad. Sci. (Ser. 2,) VI, p. 380.

Cephaloon ornatum Csy., 1897, Ann. N. Y. Acad. Sci., IX, p. 652.

Cephaloon versicolor Csy., 1897, Ann. N. Y. Acad. Sci., IX, p. 651.

Length male 11-13 mm.; female 12-17 mm. All the males we have seen are black except a few with bicolored legs. The females vary from entirely black to testaceous with every intergrade, but there are no specimens with black elytra and rufous pronotum.

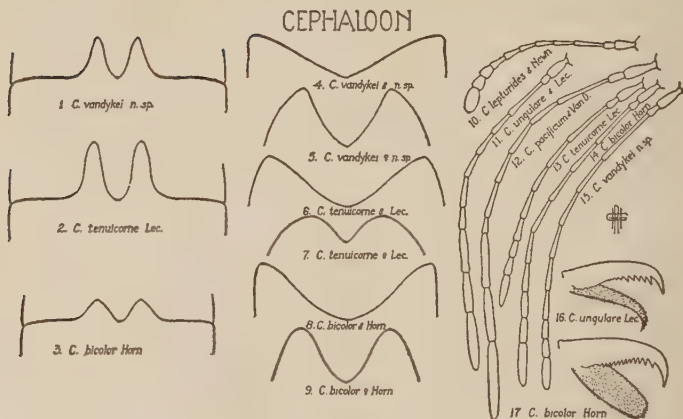
Type locality, Vancouver Island. In all probability this type was collected in the interior of British Columbia as in 1874, specimens from this region were often labelled according to the residence of the sender.

We have examined thirty males and one hundred and forty females from British Columbia, Montana, Idaho, Alberta and Washington. Some other localities mentioned in literature are not reliable, as the species have been greatly mixed in collections.

6. *Cephaloon vandykei* Hopping, n. sp.

Length male 13.6 mm. Colour testaceous with 4th to 8th antennal segments piceus, head piceus from between the eyes basally leaving spots immediately behind the eyes testaceous and with the ventral surface, except prosternum and part of the head, piceus; front legs testaceous, middle and hind legs bicolored; elytral margins narrowly bordered with black and the suture with basal one fourth and scutellum black.

Head moderately finely punctured, eyes coarsely granulate; pronotum campanulate, finely punctate, as wide at the middle as at the base, lateral margins behind the middle emarginate; elytra wider at the base than the pronotum, sides straight, tapering, to the rounded apices, covered with a fine, moderately long pile, and moderately finely punctate; middle ventral segment with bifurcate



process, the teeth moderately long and acute; claws pectinate, pulvilli robust and obtuse; last ventral broadly emarginate. Length female 15 mm. The female differs from the male only in size and colour with elytra piceus and only the metasternum black; the light coloured portions are more rufous and the last ventral narrowly deeply emarginate.

Holotype, male, No. 3734 in the Canadian National Collection, Placerville, California, May 1932, F. T. Scott.

Allotype, female, No. 3734 in the Canadian National collection, Placerville, California, May 1932, F. T. Scott.

Paratypes in the collections of F. T. Scott, E. R. Leach and California Academy of Sciences, Van Dyke collection, and that of the author, 8 males and 3 females from Placer County, California.

Length male 10-13 mm.; female 12-16 mm. The females of this species have been generally known as *C. bicolor* Horn on account of the black elytra and rufous pronotum which seems to be constant. Horn himself apparently considered this conspecific with his type of *C. bicolor*. The males, which are constantly testaceous above with black vitta margining the elytra, seem to have been generally unknown. They closely resemble the males of *C. bicolor* Horn but may readily be distinguished by the characters given in the key and the bifurcate process as given in the cut (Fig. 3).

A NEW SPECIES OF VECTURA FROM
SOUTHERN CALIFORNIA

(Coleoptera: Melyridæ)

BY FRANK E. BLAISDELL, SR.

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San Francisco, California*

In his Coleopterological Notices, VI, 1895, Thos. L. Casey,¹ founded the genus *Vectura* and described two new species. They are characterized by the moderately depressed cuneiform body; small and rather elongate head with the eyes near the base; pronotum more or less constricted just behind the apex and sinuate before the prominent and acute basal angles, base broadly lobed and sinuate laterally at base of the angles; discal submarginal excavated lines present, attaining about apical fourth. Epi-pleuræ rather wide, flat, subhorizontal, gradually narrow behind the middle and pubescent. Tibiæ devoid of spinules; ungual appendages extremely unequal, the inner long, the outer rudimentary. Integuments more or less densely pubescent, with the hairs appressed to the surface, none erect.

An addition to the genus may be described as follows:

Vectura fulvescens Blaisdell, n. sp.

Form cuneiform, moderately depressed and more or less strongly expanded behind, a little more than twice as long as wide. Color ochreous, head more or less rufo-testaceous; distal segments of the antennæ, last three of the maxillary palpi, metasternum and tarsi nigro-piceous; abdomen black to more or less irregularly piceous. Elytra densely pubescent, less so on the head and pronotum, hairs closely appressed to the surface and fulvous in color. Body beneath less densely pubescent, hairs finer and ashy in color. Punctuation fine throughout.

Head triangular before the post-ocular line, moderately elongate when fully extended, widest across the eyes and about four-fifths as wide as the pronotal apex; width on the post-ocular line, one-sixth greater than length from that line to the clypeal apex. Frons plane, slightly and irregularly impressed; lateral margin before the eyes fine and arcuately sinuate within the partly visible antennal insertions. Clypeus transversely oblong, about one-half wider than long, apex truncate, sides scarcely convergent, base arcuate. Labrum noticeably wider than long and quite semi-

¹ *Annals N. Y. Acad. Sci.*, VIII, July, 1895, p. 591.

circularly arcuate at apex. Maxillary palpi moderate in stoutness, terminal segment subconical, two and one-half times as long as wide and equal in length to the third antennal segment; third short and about as wide as long, second obconical and somewhat inflated in apical half. Eyes large, length quite equal to width of clypeal base, facets not coarse and well defined. Tempora not in the least prominent, parallel. Antennæ moderately elongate, about attaining the basal fourth of the pronotum; segments two to five inclusive elongate, second, fourth and fifth obconical, second slightly stouter and equal to the third in length, the latter cylindrobconical and a little more than twice as long as wide, fourth and fifth shorter and about a half longer than wide; first more robust, distal six segments gradually incrassate.

Pronotum subquadrate, one-fourth wider at basal third than long, apex broadly but not strongly arcuate, slightly reflexed laterally, angles subacutely prominent laterally before the rather strong subapical constriction; sides moderately convergent, broadly but not strongly arcuate between the subapical and subbasal sinuations, margins serrulate; basal angles subacutely prominent, well defined by the lateral and basal sinuations, somewhat reflexed, posterior margin of each arcuate; base about one-fifth wider than apex, broadly and arcuately lobed, almost straight in middle two-fourths, quite sharply sinuate at lateral ninth. Disk moderately convex, submarginal impressed line well marked, rather coarse, slightly incurved at base, its surface and margins irregular, shining, the lateral edge bounded by a slight subacute ridge that curves outward in basal fourth to tip of basal angles; submarginal area more or less impressed, most so at subbasal sinuations; central area less convex before the base, subapical constriction strong laterally, more or less feeble across the disk.

Elytra suboval, widest at apical third, gradually dilated to apical fourth, twice as long as wide across the humeri, not quite three and a third times as long as the pronotum; base broadly emarginate, scutellum subquadrate, humeri broadly and evenly rounded, abruptly precipitous and inflexed laterally; sides gradually divergent and broadly arcuate, less so in apical fourth and more rapidly convergent to the ogival apex, margin very finely serrulate; disk somewhat flat in about basal fifth, noticeably so on the humeri; sides gradually and rapidly decreasing in abruptness of the declivity from the humeri apicad, the surface gradually becoming evenly and less convex from side to side in about apical half; the submarginal area becomes gradually more explanate from beneath the humeri.

Abdomen moderately convex, segments two, three and four quite equal in length; first segment on the medium line about one-fourth longer than the fifth. Legs moderate in length and rather

slender; tarsi elongate and moderately slender. Metafemora attaining middle of fourth abdominal segment.

Male. Narrower, elytra less dilated posteriorly, sides in apical fourth straighter and the apex more ogival. Occipital region of the head more or less piceous; abdomen, metasternum and its parapleuræ dark piceous, metacoxæ pale. Fifth ventral segment truncate at apex. Legs slender.

Female. Elytra more broadly dilated posteriorly, sides in apical fourth more arcuate and the apex less sharply ogival. Metasternum and its parapleuræ dark piceous; abdomen more or less suffused with dark piceous. Fifth segment somewhat deflexed at apex.

Measurements. (Types) Length 3.2-3.5 mm.; width 1.2-1.6 mm.

Holotype, female, No. 3724, and allotype, male, No. 3725, in the author's collection, Museum of the California Academy of Sciences. Collected by Mr. L. J. Muchmore in San Bernardino County, August 19, 1927. Two paratypes in the collection of the Los Angeles Museum.

The differential characters of the three known species can best be presented in a synoptic statement as follows:

Body black; elytra, legs and antennæ towards base, testaceous.

Pubescence white, extremely dense, hairs rather long, stout and subsquamiform. Pronotal apical angles rounded, scarcely at all prominent; subapical constriction very broad and subobsolete. Female. S. W. Utah*albicans* Casey

Head and pronotum pale.

Body pale ochreo-testaceous throughout; maxillary palpi and antennæ toward tip nigro-piceous. Pubescence moderately dense, yellowish-white. Pronotal apical angles more or less subacute and prominent. Female, metasternum black. Male, occiput more or less piceous; prosternum at middle clouded with piceous; metasternum and abdomen nigro-piceous. Yuma, Arizona.*longiceps* Casey

Body fulvo-testaceous; maxillary palpi and antennæ toward tip nigropiceous. Pubescence dense and fulvous on upper surface, ashy beneath. Pronotal angles subacute and prominent laterally, subapical constriction strong at sides. Male, occiput somewhat piceous; abdomen, metasternum and its parapleuræ, black; metacoxæ pale. Female, head rufo-testaceous; metasternum and its parapleuræ nigro-piceous; abdomen more or less suffused with nigro-piceous. San Bernardino County, Calif.*fulvescens*, new species

NOTES ON ÆGIALIA WITH DESCRIPTION
OF A NEW SPECIES

(Scarabæidæ; Coleoptera)

BY LAWRENCE W. SAYLOR

*Berkeley, California**Ægialia* (Leptægialia) *browni* Saylor, n. sp.

Male holotype: Rufous throughout, the elytra darker, faintly shining. Head more than three-fourths as wide as pronotum; clypeus finely and very closely granulate; front punctured, the punctures not coarse, distinct throughout, somewhat confluent near frontal suture; clypeal suture impressed; genæ broadly rounded but distinct. Thorax widest at middle, lateral margins evenly arcuate, in basal half distinctly crenate at hind angles, base strongly margined; disc with large and small punctures intermixed, the small punctures very dense along the anterior margin; the coarse variolate punctures sparser at middle, usually separated by about their own diameters, midway between the middle and sides a group of much denser punctures, sparser at hind angles, very sparse along lateral margins. Elytra with striæ moderately impressed, coarsely punctured, the punctures separated by their own diameters, closer near apex; intervals feebly convex, very finely rather densely punctured; humeri very feebly dentate. Abdomen and metasternum very finely and sparsely punctured, a few coarser punctures near the side-margins. Anterior tibiæ as in *humeralis*, the inner tooth truncate and faintly emarginate. Hind femora extremely finely and sparsely punctured; middle and hind tibiæ slender and more than three times as long as wide; hind spurs moderately stout but parallel and pointed as in *A. montana*. Hind tarsi a little more than three fourths the length of the tibiæ.

Female allotype: Similar to male but inner tooth of front tibiæ narrow and rounded at apex. Side margins of thorax crenulate. There is a good deal of variation in the lateral thoracic margins, which are simple to distinctly crenulate, especially in the female.

Holotype (Calif. Acad. Sci. Ent., No. 3841). Wolverton, Sequoia National Park, California, June, 1929, alt. 7000 to 9000 feet. (E. G. Linsley). *Allotype* same data. Designated *paratypes* will be placed in the collections of the California Academy of Sciences, National Museum, Canadian National Museum, Mr. E. G. Linsley, Mr. H. E. Hinton, and that of the author. Numerous specimens have been examined, many of them collected by Dr. E. C. Van Dyke, who has informed me that they

"were caught at dusk flying near an old decayed log, at 9000 ft. altitude." He thought that possibly the beetles bred in the old decayed woody material of the forest.

I take pleasure in dedicating this species to Mr. W. J. Brown, who has done such fine work on the *Ægialia*; Mr. Brown has very kindly compared all of my material with his types. The facies of this species separate it from all others of the genus which I have examined, as its parallel elongated form superficially relate it to *Atænius*. I have not seen specimens of *A. montana* and *A. humeralis*. The three species, *A. montana*, *A. humeralis*, and *A. browni*, are very closely related, falling into the subgenus *Leptægialia* Br., but are readily separated by the characters given in the table below, which has been modified from Brown's tables¹; the other species in the subgenus is included for the sake of comparison:

- | | |
|--|----------------------|
| 1. Hind tibiæ three times as long as wide; hind tibial spurs less stout, parallel..... | 2. |
| ... Hind tibiæ twice as long as wide; hind tibial spurs stout, slightly wider at middle than base; humeri not dentate, Great Lake Region and Western Canada..... | <i>rufescens</i> Hn. |
| 2. Pronotum with a large area on each side extending from base almost to the anterior angle virtually impunctate; these areas without coarse punctures and with the fine punctures sparse and very indistinct; elytral humeri not dentate. British Columbia and Rocky Mountains..... | <i>montana</i> Br. |
| ... Pronotum without impunctate areas on the sides, the coarse punctures very sparse near the posterior angles, the fine punctures distinct throughout..... | 3. |
| 3. Elytral humeri finely but strongly dentate; spurs of posterior tibiæ a trifle more slender. N. E. United States..... | <i>humeralis</i> Br. |
| ... Elytral humeri feebly and very indistinctly dentate; spurs of posterior tibiæ a trifle stouter as in <i>montana</i> ; anterior tibiæ as in <i>humeralis</i> . Southern Sierra Mountains. Calif..... | |
| | <i>browni</i> n. sp. |

The southernmost locality for *A. blanchardi* in California has been given by Dr. Van Dyke as Del Norte County.² Recently

¹ W. J. Brown, Revision of the N. A. Species of *Ægialia*, Canadian Entomologist, January, 1931, pgs. 12-15.

² E. C. Van Dyke, 'Notes on Scarabæidæ'. Pan-Pacific Ent., Vol. IV, no. 4, pgs. 151-152. April, 1928.

I have collected specimens at Ben Lomond, Santa Cruz County, Calif., May 11, on the sand adjoining a small river. I also have a specimen collected in July at Riverton, El Dorado County, Calif., by Mr. H. E. Hinton; these two records extend the known range several hundred miles southward. I believe a specimen of *A. opaca* Brown (described from British Columbia and Alberta) taken by Mr. Hinton at Tuolumne County, Calif., and by him kindly presented to me, represents a new record for California. I have collected *A. conferta punctata* Br. at Modesto, Calif., in the debris washed up from the irrigation ditches. All the material mentioned above has been checked by Mr. Brown.

ANOTHER CICINDELA

BY WARWICK BENEDICT

University of Kansas

While collecting last summer in the Guadalupe Mountains of southwestern Texas, I took a small series of a *Cicindela* new to our fauna, being determined by Dr. Walther Horn of Berlin as *politula laetipennis*, a subspecies described by him from Saltillo, Mexico, some twenty years ago.¹

Dr. Horn wrote me that of the two examples in his type series, both were blue, one immaculate and the other showing only a broken marginal line from behind the middle to apex with apical lunule and one dot behind the middle of elytron.

The eighteen Texas specimens are blue or blue-green and, with one exception, show no marking other than a very faint marginal line at apex which appears on four or five examples. The one exception has an entire marginal line from base to apex with a short oblique middle band and just a suggestion of the apical lunule.

The beetles did not seem to occur lower than 6000 feet and were found from there up to about 7500 feet, on stones and bare ground of the mountainside, far from water.

¹ Archiv f. Naturgesch. Vol. 79 A 11 Page 32.

THE GENUS ÆCLIDIUS VAN DUZEE (Homoptera-Fulgoridæ)

BY E. D. BALL

University of Arizona, Tucson

The members of this genus are all very small delicate forms resembling the species of *Æcleus* in the long narrow trough-like vertex, but in this case the trough narrows apically while in that genus the reverse is true. Like that genus the hind tibiae are unarmed but the nervures are not dotted while in that genus they are. Types in the collection of the author.

Van Duzee established the genus for his *O. nanus* from southern California. Later he described *fraternus* from Mexico and referred his *Brixia fulgida* and *fuscus* from Jamaica here. Fowler in the *Biologia* described *Æcleus tenellus* from Guerrero which undoubtedly belongs to this genus. *O. fraternus* has recently been taken in Arizona and Utah. Four new species belonging to the genus have been taken in Arizona and are here described. The six species belonging to our fauna are easily separated by the following key.

- A. Three definite carinae on the mesonotum.
 - B. Small (less than 3.5 mm.) pale tawny, no spot on stigma.
 - C. Four apical cells, including nodal, in a row along costa.
 - 1. *nanus* Van D.
 - CC. Three apical cells, including nodal, in a row along costa.
 - 2. *brickellus* Ball
 - BB. Large (over 3.5 mm.) with a dark spot on stigma.....
 - 3. *fraternus* Van D.
- AA. Only one carina on mesonotum.
 - D. A transverse black band across the anteapicals.....
 - 4. *transversus* Ball
 - DD. Bands reduced to a spot on stigma.
 - E. Five anteapicals, the inner two reduced.....5. *carolus* Ball
 - EE. Three anteapicals.....6. *nimbus* Ball

Æclidius brickellus Ball, n. sp.

Resembling *nanus* Van D. but with only three apical cells in a row with the nodal instead of four. Length 3-3.5 mm.

Vertex very slightly wider than in *nanus*, the face in profile more inflated with a definite angle between vertex and front instead of rounding over above and sloping uniformly throughout. Pronotum longer than in *nanus*. The mesonotum definitely tricarinate as in *fraternus* and *nanus*, elytra as in *nanus*, the apical

nervure from the outer anteapical cells only forking once and thus forming two cells behind the nodal, instead of forking twice and thus forming four cells in a row including the nodal. Male plates broad at the base then narrowed and twisted like a crooked finger instead of narrow at base then gradually widening to an abrupt oval tip as in *nanus*. The lateral projections from the anal ring large and foliaceous instead of blunt or slightly hooked.

Color: pale tawny, the carinæ and margins lighter, often brown shading appears along the margins of the carinæ. Elytra hyaline, nervures and especially the cross nervures and apical portions tawny.

Holotype, female, allotype, male, and two paratypes, Tucson, April 12, 1930; twelve paratypes Tucson March 22, 1931, May 5, 1929; Patagonia Sept. 7, 1929 and Payson Aug. 3, 1929, all collected from the mountains of Arizona by the author.

The writer has collected the above species from Logan and Soldier Summit, Utah, south through southeastern Nevada and northern Arizona to the Mexican border in Arizona, while *nanus* has been taken at many points in southern California to the border. *O. fraternus* Van D., described from the Gulf of California, has been taken at St. George, Utah, by E. W. Davis, from the Santa Cruz River, the Baboquivari Mountains and Yuma, Arizona, and Altar, Mexico, by the writer. It is much larger and of a darker shade.

Æchidius transversus Ball, n. sp.

Resembling *tenellus* but smaller and more definitely marked. Black with the carinæ light, the claval areas smoky, corium hyaline with a broad band across the anteapicals. Length ♂ 4 mm.

Vertex broader than in *nanus*, almost parallel margined to the middle then narrower to the apex, rather than narrowing all the way as in that species. Margins of front more foliaceous but ending abruptly on the clypeal margin; the head in profile much deeper and more nearly truncate in consequence. Venation of the pattern of *nanus* but with less forking of the apical nervures, forming only six, relatively large, apical cells. Male plates (ivory white) finger-like bent upward at a right angle, slightly divergent and almost reaching the anal collar.

Color: Body dark smoky brown, the carinæ of vertex and front broadly white; a broad black band across the side of the head below the ocelli. A narrow black band just above the lower white band on front is continued across the genæ, the outer part of the pronotum and the alulets. Median and circular carinæ of pro-

notum white, the median carina and the oblique margins of the mesonotum ivory. Elytra hyaline, the claval areas brown; a broad smoky brown band covers the nodal cells and extends across the anteapicals to the apex of clavus. There is an ivory spot in the anterior angle of the nodel and a hyaline one inside this. The two attingent anal veins darkened.

Holotype, male, and two paratype males, taken by the writer at the High Tanks, "Tinajas Altas", Arizona, May 17, 1932.

Oecidius carolus Ball, n. sp.

Resembling *transversus*, less heavily marked, with the two inner anteapical cells very small, and eight apicals. Length 4 mm.

Vertex much broader at the base than in *transversus* resembling *nanus*, the carinate margins of vertex and front, especially the latter, not so foliaceous. Head as seen from side acutely angled, with the apex rounding instead of almost vertical as in *transversus*. Venation resembling *nanus* except that the two inner anteapicals are reduced and shifted anteriorly, the apical nervures forked, forming eight apicals. Male plates broader and shorter than in *transversus* the anal collar much reduced and distinct.

Color: Body black, the carinae of vertex and the front white except for the broad transverse band below ocelli; the genae alternately banded in black and white. Median carina and lateral margins of pronotum and scutellum ivory. Elytra hyaline, nervures brown, scutellar margin narrowly ivory, sutural margin alternating ivory and smoky; a triangular black spot in nodal cell omitting the ivory nervure and one oval hyaline spot in front, the transverse nervures heavily embrowned and usually a brown cloud on the basal portion of clavus.

Holotype, female, allotype, male, and one female paratype taken by the writer at Coolidge Dam, Arizona, May 18, 1930, and one male paratype taken at Wickenburg, Arizona, Aug. 21, 1929. Strikingly distinct by the venation alone.

Oecidius nimbus Ball, n. sp.

Resembling *carolus* but less definitely marked, with a longer vertex and only three anteapicals. Length 3.5-4 mm.

Vertex even wider at base than in *carolus* and much longer, produced in front of eyes and meeting front in almost a right angle. Face as seen from side retreating, the lower portion of the foliaceous carinae auricularly expanded. Venation reduced, only three anteapicals, the two inner ones wanting, the outer one egg-shaped, acute posteriorly; apical nervures forking, forming nine apical cells.

Color: Black above and below, the elytra hyaline, carinæ on vertex and pronotum narrowly light, face and genæ black. Folia-ceous carinæ of front with three pairs of light spots about equally spaced, the largest below. Mesonotum black with the median carina and the outer part of the oblique margins orange. Elytra hyaline, the margins pale, the sutural margin with three black dashes. Nervures pale brown, the transverse ones darker. Anterior half of the nodal cell black; two thirds of the anterior marginal nervure ivory, just inside of which there is a small triangular hyaline area within the black area.

Holotype, female, allotype, male, and four paratypes, May 15, 1933, and eight paratypes June 21, 1930, all taken at Tucson, Arizona, by the writer. Strikingly distinct by the three instead of the usual five anteapicals.

A NEW SPECIES OF SYMPYCNUM FROM MEXICO

BY M. C. VAN DUZEE

Buffalo, N. Y.

Sympycnum dampfi Van Duzee, n. sp.

Male: Length 2.4-2.8 mm. Face long, very narrow, linear, except at upper and lower ends, where it is a little wider; white pollinose; palpi narrow, its pollen and hair white; front black; antennæ (Fig. 5) with first two joints yellow, third brown, longer than wide, rounded at tip, arista basal, as long as middle basitarsi; lower orbital cilia white.

Dorsum of thorax dark blue-green, with rather thick brown pollen, and with a somewhat indistinct brown line in which the acrostichal bristles are inserted; these are few but rather long. Five dorsocentrals in each row; pleuræ black. Abdomen (Fig. 1) with first three segments yellow on the sides, but sometimes first segment is largely black and second and third segments may have the yellow of the sides extended broadly over the dorsum; hairs of abdomen yellowish, but appearing black in certain lights; hypopygium conspicuous, black, its lamellæ elongate-oval, black, with a few small hairs at tip.

All coxæ yellow, anterior pair with a few minute yellow hairs on the front surface; posterior pair with one yellowish bristle on outer side; front and middle femora and tibiæ a pale yellow; hind femora yellow with apical third black above; hind tibiæ yellowish brown, sometimes wholly brown; front legs (fig. 2) with their hairs mostly white, especially those of the tarsi, femora narrowed and bent on apical third or more, with several long black hairs below on apical third; front tibiæ a little arched, concave below, with a row of nearly erect, black, spine-like hairs below; middle

leg (fig. 3), femora with a few black hairs below, tibiae¹ narrow at base, widening a little below, widest at basal third, where there are a few bristle-like hairs above, also two longer bristles above, one near basal fourth and the other near the middle; hind tibiae with stiff, black bristle-like hairs below, which are hooked at tip on basal part, running into straight bristle-like hairs apically, and with two bristles at tip; all tarsi plain; length of front tibiae as 40, of middle as 63, and of posterior as 98; fore tibiae with curved bristles below, some of which are longer than width of tibiae at widest part; fore tarsi below (fig. 6) with two small bristles on apical half, their joints as 26-18-10-5-6; of middle pair 40-20-11-8-8; of posterior pair as 20-31-15-10-8. Calypters and halteres yellow, cilia of former yellow, the hairs somewhat brown at base.

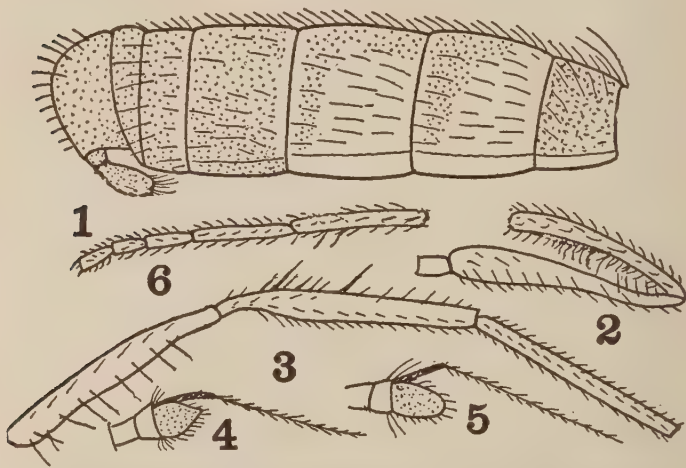
Wings grayish hyaline; third and fourth veins nearly parallel, both bent backward toward tips, third a very little recurved at tip, fourth very slightly bent at basal third, ending in the apex of the wing; last section of fifth vein straight, its length as 33, cross-vein at a right angle with fourth, its length as 15; anal angle of wing gradually rounded off, so as to make the wing somewhat narrowed at root.

Female: Color, wing venation and face about as in the male; antennae (fig. 4) with third joint triangular, as long as wide, pointed at tip; abdomen with first segment wholly black; second with apical third black; third yellow with apical half black, its hair long, stiff, and almost wholly black; hair on legs wholly black, or nearly so; middle tibiae with two bristles above.

Described from many males and females, all taken by Dr. A. Dampf, March 5, 1933, at Convento del Desierto, State of Mexico. He found them sheltered in the interior of a small masonry work over a shallow well, which was full of mud and old leaves; so great were the numbers that he took 18,800 with a few sweeps of his net.

Among the species of North America, including Mexico, *dampf*i would run to *inæqualis* Van Duzee, taken at Clear Lake, California. That species has all tibiae plain, while this has both front and middle tibiae distinctly enlarged; widest at apical third, the fore tibiae with curved bristles below on whole length, but the longest just beyond the middle; hind tibiae with a row of long bristle-like hairs, with bent tips, below on whole length; *inæqualis* has the third antennal joint triangular, pointed at tip, while *dampf*i has this joint broadly rounded at tip, and the hypopygial lamellae in *dampf*i are elongate-oval, black, and a little clavate.

Among South American species it comes nearest *pallidicornis* Van Duzee, from which it differs in the form of third antennal joint as above, and that species has the hypopygial lamellæ yellow, and of different form.



Explanation of figures of *Sympycnus dampfi* new species.

Fig. 1, Abdomen of male; Fig. 2, front femora and tibia; Fig. 3, middle femora, tibiae and basitarsus of male; Fig. 4, antenna of female; Fig. 5, antenna of male; Fig. 6, front tarsi of male.

ANDRENA (ANCYLANDRENA) HETERODOXA CKLL., 1930

Mr. Timberlake points out to me that the name of this Californian species is preoccupied by *A. heterodoxa* Perez, 1903. I was quite well aware of the latter species, which occurs in Sicily, but unaccountably forgot it when naming the Californian species, which may now take the name *Andrena atoposoma* n. n.
—T. D. A. Cockerell.

TAXONOMIC NOTES ON SOME COLORADO ASILIDÆ

BY MAURICE T. JAMES

University of Colorado

HODOPHYLAX ARIDUS James

Am. Mus. Nov., 596: 1-2, 1933.

Since the publication of the original description of this species, additional specimens, including several males, have been furnished me by Dr. R. H. Painter. The following remarks and description are based on this series.

There is some variation in the females, particularly in the extent of the pollinose markings of the abdomen. The sixth segment is usually wholly shining, except laterally, the segments beyond the sixth are shining and included in the short, stubby ovipositor. The anal cell is variable, it may be closed and short petiolate, closed in the margin or very narrowly open. The proboscis is short and moderately thick. The first abdominal segment is very short.

Male. Similar to the female, but on an average slightly smaller. It differs from the female only in the abdominal markings and in sexual characters. First abdominal segment wholly shining; second shining, except laterally; third and fourth shining on the anterior half, except for the lateral margins and a median semi-circular marking; posterior half of these segments pollinose except for a median shining spot; on segment three this spot connects with the shining region of the basal half, so that on this segment the semi-circular pollinose marking is isolated. Segments five and six wholly pollinose, their anterior margins narrowly shining, except laterally; segments beyond the sixth withdrawn under the sixth; genitalia small and inconspicuous. One rubbed specimen indicates that the abdominal regions, covered with pollen, are reddish in ground color, not black, as on the naturally shining areas.

Allotype, male, Boone, Colo., 5000 ft., Aug. 17, 1928. (R. H. Painter).

Also described from two other males and eight females, same data as allotype, and one male and one female, Hamilton County, Kansas, 4000 ft., Aug. 6, 1928 (Painter).

Perhaps the relationship of *Hodophylax* is closer to *Parataracticus* Cole than to *Ablautus* Loew. In both *Parataracticus* and *Hodophylax* the anterior tibiæ terminate in a slender spine; in the latter, this spine is moderately long and crooked. This char-

acter was not mentioned in the original description because it was present on only one tibia, and was considered an abnormality. The antennal structure more nearly suggests *Ablautus*. The three nearctic genera of Dasypogoninae which lack pulvilli may be separated as follows:

1. Mystax confined to the oral margin.....*Hodophylax* James
2. Mystax extending upward upon the face.....2
- ... Antennal style wanting; anterior tibiæ ending in a thick, claw-like spur.....*Parataracticus* Cole
- ... Antennæ with a distinct style; anterior tibiæ without a terminal spur.....*Ablautus* Loew

In one female specimen, a part of the pupal case has remained clinging to the head. This indicates the usual median thorns and the "lateral processes" of Malloch, which bear three thorns each, the lowest one fully as large as the other two.

ERAX AFFINIS Bellardi

One female, Lake Creek, Colo., July 5, 1932 (Lou Davis), and one female, Gateway, Colo., July 20, 1932 (Davis).

The above specimens agree perfectly with Hine's redescription of this species, which Bellardi described from Mexico. I know of no previous record from the United States.

STICHOPOGON TRIFASCIATUS Say

Neopogon snowii Bezzi, from Wallace County, Kansas, is probably a synonym. Bezzi distinguishes his species from *trifasciatus* by the brownish color of the abdomen, the complete band on the fourth abdominal segment, and the white thoracic bristles. I have not seen the type of *snowii* but I have examined the specimen which Bezzi mentions in the Snow Entomological Collection ("in collectione C. F. Snow, Universitatis Kansensis, in urbe Lawrence, sub nomine *trifasciati* Say, species haec certe latet"), and it is identical with specimens which I have collected in eastern Colorado and western Kansas. There is not a single one of Bezzi's diagnostic characters which is not subject to considerable variation, as indicated by a series of a hundred or more specimens from this region.

Heteropogon wilcoxi James, n. sp.

Male. Head, thorax, and abdomen, except appendages and genitalia, wholly black in ground color, but wholly obscured by a grayish pollen, and wholly clothed with white bristles and pile.

Antennæ slender, black; first and second segments subequal in length; style slender, one-half to two-thirds the length of the third segment. Proboscis black. Mystax bushy, silky above, but consisting of stiff bristles just above the oral margin. Pile of cheeks bushy and silky. Dorsum of thorax, in addition to the usual grayish pollen, with patches of yellow pollen, the bristles and more conspicuous pile confined largely to the yellow-pollinose areas; there are three longitudinal stripes devoid of this yellow pollen, a median line, bisected anteriorly, which extends from the pronotum to the base of the scutellum, and two shorter lateral ones; these are confluent at the suture. In some specimens, particularly rubbed ones, these areas are indistinct. Mesonotum behind the suture with 15 to 20 bristles on each side, mostly lateral, a few median, and several strong bristles on each side before the suture. Scutellum with 3 to 4 pairs of marginal bristles and two tufts of pile, one on each side of the apex; disc pilose or bare. Pleura with conspicuous tufts of pile on the propleura, mesopleura, and sternopleura; trichostical pile and that on the sterna and coxæ bushy and abundant. Femora black, white-pilose; middle and hind femora with a row of white bristles on the inner surface; tibiæ red; tarsi chiefly red, somewhat darkened apically; tibiæ and tarsi with white pile and bristles except for some short, stubby black bristles on the under side of the tarsi, and a conspicuous brush of black bristles on the second fourth of the middle tibiæ; the middle femora may bear a few black hairs opposite to these brushes; anterior tarsi clothed uniformly with silvery pile. Wings hyaline, veins yellow, the anal cell narrowly open. Abdomen with bushy pile laterally, longest on the anterior segments, otherwise clothed only with short, inconspicuous pile; pile of venter longer and more conspicuous. Genitalia largely red, of moderate size, white pilose and shining. Length, 15 to 16 mm.

Female. Similar to the male. Ovipositor black; the black brush on the middle tibiæ and the black hairs on the middle femora wanting.

Holotype, male, taken near Model, north-east of Hohn, Colorado, August 8, 1933 (H. G. Rodeck and M. T. James), in the collection of the University of Colorado.

Allotopotype, female, same data.

Paratopotypes, twelve males, fifteen females, same data.

Paratypes, one male, two females, Mesa de Maya, south of Tobe, Colorado, August 4, 1933 (Rodeck and James); ten females, four males, 35 miles north of Springer, N. M., June 28, 1931 (Don Prentiss and H. A. Scullen); one male, Joliet, Ill., July 4, 1916; three males, two females, no data, probably Colorado.

This species is quite distinct, and may easily be recognized by the uniformly white vestiture of the entire body, the black ground color and the hyaline wings. It is named in honor of Mr. Joseph Wilcox, who had described the species in manuscript, and who, upon receiving paratypes from me, waived the privilege of publishing his description.

The members of the topotype series were taken resting near the dead tips of shrubs in a watchful attitude. One of the undated male paratypes is pinned with a cicada, evidently its prey.

THREE NEW SPECIES OF MOTHS FROM ALASKA

(Lepidoptera, Phalænidae)

BY FOSTER H. BENJAMIN

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The types of two of the new species described below are from a series of Alaskan specimens donated by Mr. F. W. Morand through Mr. August Busck; the type of the other species has long remained undescribed in the collection of the U. S. National Museum.

Archanarta acraea, Benjamin, n. sp.

Eye small and reniform shaped, strongly lashed, slightly hairy. Male antenna simple and ciliated. Fore tibia unspined.

Head, collar, thorax, and abdomen with a mixed black and white vestiture. Fore wing bluish white powdered with black; basal line black, indistinct, excurved from costa to submedian interspace, thence obliquely excurved to the inner margin; transverse anterior line strong, black, nearly erect from the costa through the cell, excurved in the submedian region, inwardly pointed on vein 1, thence excurved to the inner margin; claviform not defined but fused with the transverse anterior line and forming a slight thickening; orbicular and reniform poorly defined pale blotches; transverse posterior line black, obliquely excurved from the costa, bent inwardly to a point touching the reniform, outwardly oblique and produced to a w-mark on veins 3 and 4, incurved to the inner margin but interrupted by small pointed extensions on veins 2 and 1; subterminal line obsolescent, inwardly defined by a powdery black shading which forms two obscure w-marks, one subapical and one on veins 3 and 4; terminal line black, broken into a series of bars by white dots on the veins; fringe

checkered black and white. Hind wing sordid white, powdered with some black which forms a discal dot, a suffused median shade, and a terminal line, besides somewhat marking the veins and slightly suffusing the inner and outer margins; fringe sordid with only an indication of an interline. Beneath sordid white with some blackish powdering; discal dots faint; transverse posterior line of fore wing and median shade of hind wing indicated as a common shading; terminal lines and fringes as on upper side. Expanse, 23 mm.

Superficially similar to the other three species belonging in the genus, differing from two of these, *quieta* Hübner and *constricta* Walker, by the lack of spines on the fore tibia and the simple ciliated antenna. Agreeing with the third species, *bryanti* Benjamin, on these characters but differing by the distinct and contrasting maculation on the paler ground.

Genitalia: Similar in pattern to those of the other species belonging in the genus, but differing from all known species by possessing a narrower uncus and tegumen.

Type locality: Stony Creek, McKinley National Park, Alaska.

Holotype, male, unique, F. W. Morand, collector, Cat. No. 49740, U.S.N.M.

Epipsiliamorpha æquæva Benjamin, n. sp.

Similar to *E. alaskæ* Grote, and superficially appearing to be a suffused specimen of that species.

Male antenna heavily serrate, the shaft somewhat smaller in diameter than that of *alaskæ*, the serrations somewhat shorter.

Fore wing violaceous gray marked by black, the medial and terminal areas disconcolorously rufous brown; ordinary lines and markings like those of *alaskæ* except that the transverse posterior line closely approximates the distal margin of the reniform, the black markings mesad of the claviform are larger, and the claviform is reduced to an inconspicuous luteous dot followed by fuscous powdering. Hind wing as in *alaskæ* but with more fuscous powdering on the white disc, the distal portion blackish but not defined as a black band and possessing a well marked series of black terminal dots. Beneath, creamy white with some of the maculation of the upper side showing through. Expanse 28 mm.

Genitalia: Essentially as in *alaskæ*; the clasper somewhat shorter; ædæagus about one third longer, the penis with the spinose areas much reduced.

Type locality: Goodnews River, Alaska.

Holotype, male, "Aug", Cat. No. 44752, U.S.N.M.

Pachnobia morandi Benjamin, n. sp.

Eye almost reniform shaped, lashed, slightly hairy. Male antenna strongly serrate and fasciculate, nearly pectinate.

Head, collar, thorax, and fore wing mixed dull rufous and gray. Basal line and claviform obsolete; transverse anterior line dull fuscous, irregular, outwardly oblique from costa to submedian fold, thence nearly erect to inner margin; orbicular and reniform poorly defined, the former as a large rounded rufous blotch, the latter as a rufous blotch, somewhat kidney shaped, and bearing an obscure fuscous central crescent; transverse posterior line dull fuscous, produced to points on the veins, excurved around the cell, incurved below vein 4; subterminal line indicated by the contrast between the darker subterminal and paler terminal shades; fringe practically concolorous with the dull sordid terminal area. Hind wing almost uniformly suffused with dull fuscous; discal mark inconspicuously darker; fringe paler, luteous, interlined with fuscous. Beneath, dull luteous, suffused and speckled with fuscous, with a dull fuscous common line, the hind wing with a strong black discal mark. Expanse, 32-34 mm.

Genitalia with the general pattern and habitus of those of *okakensis* Packard, differing mainly by having the uncus evenly tapered instead of spear-shaped, and by having the clasper shorter and heavier; the ædæagi of the two species very similar, that of *okakensis* being somewhat the longer.

Type locality: McKinley National Park, Alaska.

Number and sexes of types: Holotype male, one male paratype, F. W. Morand, collector, Cat. No. 44753, U.S.N.M.

NOTE ON ROTHSCHILDIA

While my manuscript¹ was in the hands of the printer; Vogler, 1933, Ent. Zeitschr., "XXXVII," (15), p. 121, ff. 4-5 and p. 122, figured and discussed, under the name "*Rothschildia lebeauina rectilineata* Burmier" (recte *Rothschildia lebeau rectilineata* Bouvier), specimens which certainly seem superficially indistinguishable from those of *R. forbesi*. I am inclined to think that the locality, "Peru," based on specimens which emerged in Germany from cocoons furnished by Steeg, is erroneous. The true *rectilineata*, like *lebeau*, is a form with the hind wing conspicuously broad so that the outer margin is much more nearly parallel with the inner margin than in specimens of the Texan species.—F. H. Benjamin.

¹ Pan-Pac. Ent., X, pp. 12-16, 1934.

OBSERVATION ON A METHOD OF DISSEMINATION EMPLOYED BY MITES

BY WALTER EBELING

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Riverside, California*

In the course of some experiments made with the citrus red spider (*Paratetranychus citric* McGregor), the writer had occasion to place thirty mites upon a single leaf of each of six orange seedlings. The petioles of the leaves were banded with Tanglefoot to prevent the mites escaping from the leaves. When the leaves were examined a week later they had turned to the whitish color typical of leaves heavily infested with mites. As many as eight mites per leaf were seen at one time lowering themselves from infested leaves by means of single threads. Usually the mites were lowered to another leaf on the same seedling and resumed feeding on this leaf. As far as the writer is aware, no one before has noticed mites lowering themselves from leaf to leaf by means of threads.

Further observation showed that the mites left a leaf only when the mite population on this leaf had become large and the chlorophyll nearly depleted. A mite which successfully lowers itself to another leaf with more chlorophyll is, of course, at a great advantage as far as the food supply is concerned. Mites were also observed to leave the leaf in the manner mentioned in the previous paragraph when the leaf was not isolated by means of Tanglefoot.

It is possible that if mites were to lower themselves by means of threads in the open, especially on large trees, the wind would blow them away and carry them for some distance. The writer has observed species of the true spider family Attidæ lowering themselves at the ends of threads until the threads became quite long. Even a slight breeze would then be sufficient to carry the threads and spiders for long distances. The young of some spiders of other families climb to the tops of trees and fences and emit a single thread or group of threads and are carried aloft when the threads become long enough to be carried by the wind.

MILLARD CARR VAN DUZEE, IN MEMORIUM

BY E. P. VAN DUZEE

My brother Millard C. Van Duzee, a student of the Diptera, died at his home in Buffalo, N. Y., April 21, 1934, of a heart ailment. Our father, William S. Van Duzee, at that time a building contractor in New York City, took his family south to Mobile, Alabama, for the winter of 1859-60, but found the feeling there so strong against northern abolitionists that he came back to Cincinnati on a river steamer for the balance of the winter, and it was there that my brother was born on February 20, 1860. Millard's love of Nature was the result of both inheritance and environment. Our father was a naturalist of the old school, and had gathered extensive collections in Minerology, Geology, Botany, Conchology and Ornithology, sufficient to fill a three story annex to his home in Buffalo, the upper floor of which was an astronomical observatory for which he had purchased an acromatic refracting telescope with an 18-inch objective, at that time the largest privately owned telescope in the United States. Here and at father's farm at Lancaster, N. Y., where our summers were spent, we acquired the habit of observation as well as of collecting, both of which were encouraged by our father in every way possible. Some of the happiest days of our lives were spent on hunting trips through the woods with father while he was adding to his large collection of birds. Millard and I devoted our efforts mostly to the insects and together we built up our collection which we had in common. The paths about our country home at Lancaster were lined with flower borders and about these flowers we would hunt with our nets during the evening twilight for moths, or take them as they came to the lighted windows. About 1876 Mr. A. R. Grote, then Director of the Buffalo Society of Natural Science, taught us how to sugar for moths and how to dig for pupæ and to raise larvæ, and at the close of the season he determined our material for us; he also encouraged us to work in other orders of insects, so we formed a fairly good general collection of insects.

After father's death in 1883 Millard prepared himself for his father's former activities as building contractor, a trade he followed until failing health led him to retire from active



MILLARD CARR VAN DUZEE
1860-1934

work. He began his systematic study of the Diptera in 1908, soon specializing in the Dolichopodidæ. Most of his collecting was done about Buffalo but he made several trips to New England and Washington, D. C., and at least two to Florida and two to California. He was a careful student and an industrious worker and in the 26 years he worked on the Diptera he has published 86 papers (1383 pages) in which he described as new nine genera and 914 species, besides doing much revisional work. This is an excellent showing considering that during much of that time he was following an exacting trade. His collection of about 20,000 Diptera and many insects of other orders was acquired by the California Academy of Sciences in 1931, including the types of a considerable portion of the species described by him. He passed away quietly while sitting at his study table. He leaves one son, Merrill, who lives at the family home in Buffalo.

The following bibliography of his writings on the Diptera includes all his papers known to me. A few others may be in the hands of printers to appear later. I have given the exact date of publication wherever possible. The journal *Psyche* gives no date of publication so in the case of papers from that journal and in a few other cases I have given the date the journal was received by me as a subscriber, which may in some cases be considerably later than the date of actual publication.

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AN APPARENTLY NEW PENTATOMID

BY E. P. VAN DUZEE

Rhytidolomia rita Van Duzee, n. sp.

Allied to *viridicata* Uhler, a little larger and stouter with a flattened head and more broadly expanded pronotal margins; olive-green, tinged in places with yellowish. Length 10 mm.

Head a fourth wider across the eyes than long, feebly convex across the base, the cheeks broadly depressed, sides feebly sinuate before the eyes. Pronotum about as in *viridicata* but more closely rugosely punctate with the latero-anterior margins broader. Antennal segments as 10:16:15:18:22, of *viridicata* as 8:18:12:16:18. Rostrum attaining middle of second ventral segment, its segments as 20:30:20:12, in *viridicata* reaching base of third ventral segment, its segments being as 18:30:20:16; otherwise as in *viridicata*.

Color olive-green tinged with yellow in places, especially at base of costa and on the connexivum.

Holotype, female, No. 3855, Calif. Acad. Sci., Ent., and one female paratype, taken by Dr. E. D. Ball, June 13, 1932, on the Santa Rita Mountains. This species certainly is near *viridicata* but it is larger, the head is broader before and more flattened, the form is more parallel, the scutellum is shorter behind the frenum, and the relative lengths of the segments of the antennæ and rostrum are different.